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Research on Chinese university students physical education mode in grey correlation degree model

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ABSTRACT

With rapid development of modern social economy, information, and culture, people speed up living pace and meanwhile also confront all kinds of pressures, most of people's physique is in a state of sub-health, it tells us people's health cannot be ignored. And university student is future of motherland, constructor of times; therefore universities physical education is receiving more attention from society. The paper makes comprehensive analysis of present Chinese universities students' physical education status, according to present Chinese universities students' physical education existing problems, it puts forward suggestions. Start from Chinese universities satisfaction index on physical education optional course influential numerous factors, select teachers' teaching, interpersonal relationships, learning effects factors as relative main factors, establish Chinese university students physical education optional course inclination-based grey correlation degree model, by comparing correlation degree values sizes, it gets conclusions: In the investigation of Chinese university students physical education optional course satisfaction index, badminton volleyball basketball football roller-skating and others sports events correlation degree values are relative higher, are Chinese universities students relative favored physical education courses, therefore future Chinese university students physical education should mainly base on basketball , football, volleyball, badminton and others traditional sports.

KEYWORDS

Physical education; Grey correlation degree; Satisfaction index; Physical education course; Physical health.

INTRODUCTION

In current society, physical education attracts more attentions, university students' physical education also correspondingly becomes important parts of education system. Physical education is an important factor to propel to university students' physical health and psychological health development, is the key to cultivate university students' morality, intelligence, physique comprehensive quality's all-round development. In university students' physical education aspect, present numerous of predecessors have made researches.

In 2006, Sun Yi-Fang in the article " Briefly analyze university students' physical education physical and psychological comprehensive quality development", selected Chemical Design Research Institute of Hebei, Henan University, Hua Chung College, Wuhan University four universities as investigation and research objects, by innovative statistical analysis of university students' education direction and modes, it got conclusion that physical education had important impacts on university students' ability cultivation, physical health and psychological health and so on.

In 2007,Cai Jing in the article "Changzhou city advanced physical education status and development countermeasure research", adopted investigation method, statistical method, logistic analysis method and others to make analysis of Changzhou city universities physical education teaching statues, found out present existing problems, and pointed out corresponding innovative measures on problems research.

In 2012, Kang Peng-Yang in the article "Xian city universities public physical education teaching contents selection and implementation problems research", took Xian city universities as research objects, by documents literature, investigation, interview method, experiment method to study curriculum setting contents, academic evaluation , teaching methods , teaching modes and other problems, found out present physical education existing shortcomings, and made corresponding suggestions.

The paper makes comprehensive analysis of Chinese university students' physical education status from Chinese universities physical education course contents setting status, students' selection inclination on physical education teaching contents, university students' attitudes toward physical education teaching innovation mode.

Apply grey correlation degree method, make quantitative analysis of university students' correlation degree values on each item physical education optional courses contents satisfaction index and teachers teaching learning efficiency interpersonal relationships field apparatus correlation degree values, compare present university students' satisfaction index on physical education optional course contents, and then establish regarding Chinese university students' physical education grey correlation degree mathematical model. Finally it gets conclusions: Chinese university students' physical education teaching should mainly base on football, volleyball, basketball and badminton.

RECENT YEARS' CHINESE UNIVERSITY STUDENTS' PHYSICAL EDUCATION STATUS

Chinese vocational colleges' established physical education course contents setting

According to students' different interests and hobbies, physical qualities and others, vocational colleges set up different physical education courses, their contents are colorful. But some colleges still cannot set up each kind of physical education courses in all-round direction according to demands. According to China statistical yearbook and national sports bureau, it makes statistics of following investigation data, and manually draws following TABLE 1:

TABLE 1 : Chinese vocational colleges' physical education course contents setting statistics (Unit: piece)

Type	Ball type						Body shape type			Martial arts		Water and ice type			
Event	Football	Basketball	Volleyball	Badminton	Tennis	Table tennis	Sports dance	Yoga	Aerobics	Taijiquan	Sanda	Taekwondo	Skating	Skiing	Swimming	Roller skating
Requirement	Set up above three units						Set up above two units			Set up above two units		Set up above two units				
N	230						184			138		115				

Average number	6.8

According to above TABLE 1, it can indicate that ball type, body shape type courses are Chinese vocational colleges main physical education course setting contents, secondly is martial arts, ice and water type courses, average every college set up physical education courses are 6.8 items. Therefore, on a whole, it is clear that Chinese vocational colleges physical education courses contents setting is relative plentiful. But in order to meet different students' demands, cultivate all-round talents, partial colleges should still strengthen martial arts, water and ice type courses contents setting, and enrich physical education course contents.

University students' selection inclination on physical education teaching contents

Since Chinese physical education teaching reformed, vocational colleges' physical education teaching contents were more colorful. Facing to all kinds of physical education optional courses, in case that it cannot simultaneously attend multiple kinds of physical education courses, students will consider each physical education optional courses contents emphasis, and according to theirs hobbies, physique and psychological demands, select their most favored physical education courses. Below TABLE 2 is drawn according to China's statistical yearbook data:

TABLE 2 : University students' selection inclination on physical education teaching contents

Content	Number of people that selected	Seating arrangement
Keeping fit is strong	386	2
Various practical	275	3
Entertaining	284	2
Easy to learn	262	4
The trend of the times	204	5
Content into daily life	27	7
National traditional	68	6

Above TABLE 2 is Chinese universities students selection inclination status table on universities physical education teaching contents, in order to more clearly observe, transform it into bar Figure 1, and get conclusions:

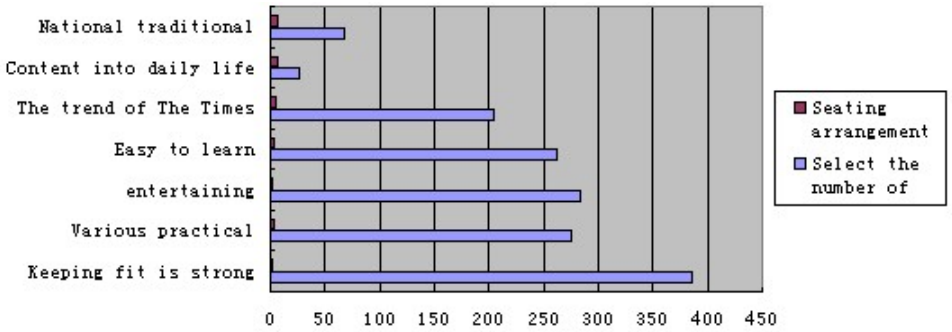

Figure 1 : The choice of college students of sports teaching content

From TABLE 2 and Figure 1, it is clear that in university students selection inclination on physical education teaching contents, events with strong fitness is priority factor that university students consider, secondly is events with strong entertaining 、varieties and practicability , for some physical exercises contents that are easy to learn, catching up with the trend of times, national traditional and

lifestyle contents, students are also fond of them. Only teaching contents conform to students' interests and hobbies then can let more students to positive participate in sports activities, and then build good foundation for lifelong sports.

University students' fondness extent on physical education teaching modes

Teaching mode is a strategic system that reflects teaching process procedural nature. A kind of students' favored teaching mode not only can arouse students' positivity on curriculum learning, but also can improve students' learning efficiency. At present, Chinese university students physical education mode will also constantly innovate with students' demands. Below TABLE 3 is Chinese university students' fondness degree table on different physical education teaching mode:

TABLE 3 : University students' fondness degree on teaching mode

Fondness degree (%) Teaching mode	Teaching and the experience type teaching mode	Situational type teaching mode	Race type teaching mode	Theory type teaching mode
Like	70.3	65.4	50.7	38.8
Dislike	16.8	23.7	30.1	42.5
Not to matter	12.9	10.9	19.2	18.7
Overall	40.3	31.2	19.4	9.1

TABLE 3 data is from China's statistical yearbook and China's statistical bureau, in order to easy to observe, draw above data into bar Figure 2 as following

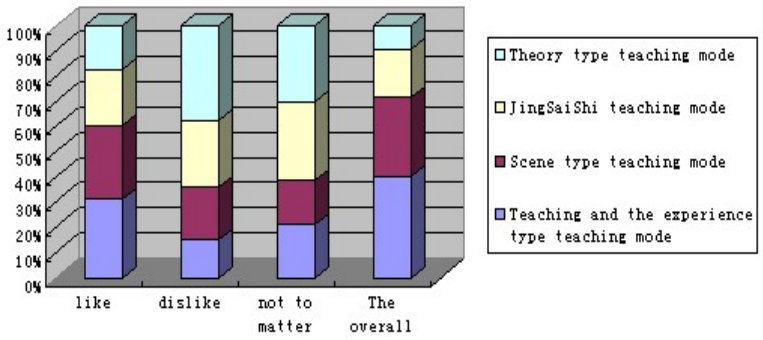

Figure 2 : College student's love in the teaching mode

By above bar Figure 2, we can discern easily that teaching and the experience type teaching mode is most favorite teaching mode of university students, secondly is situational type teaching mode, the third is race type teaching mode, the theory type teaching mode is of least fondness of students in university students physical education teaching mode. Therefore, Chinese each vocational college should more adopt teaching and the experience type, situational type physical education mode.

CHINESE UNIVERSITY STUDENTS PHYSICAL EDUCATION OPTIONAL COURSE INCLINATION RESEARCH IN GREY CORRELATION DEGREE MODEL

Chinese university students select different physical education event course according to their hobbies, and different physical education courses suffered different factors influence extents are different, students' satisfaction index on each physical education optional course is different. Therefore, utilize grey correlation degree method to establish regarding university students' physical education optional course satisfaction index and numerous optional courses contents correlation degree model, and then find out university students' most favorite physical education optional courses, and provide references for future Chinese university students' physical education teaching development.

Grey correlation degree guiding thoughts

The significance of grey correlation degree analysis is based on system overall development changes, if system changes and factor changes trends are consistent, then the two correlation degree is larger: if system changes are inconsistent with factors changes trends, or have certain differences, then the two correlation degree is smaller.

Data processing

By above researches on Chinese university students' physical education status, we can see that Chinese university students' physical education should mainly base on traditional ball type, body shape and ice water type education events are little. Utilize mathematics grey correlation degree method to carry on analogy analysis of Chinese university students' physical education optional course satisfaction index and optional courses contents, find out present university students' relative inclined physical education courses in physical education optional course.

By consulting lots of relative information and referencing Chinese statistical yearbook's data, draw into following data TABLE 4:

TABLE 4 : Data statistical table

Curriculum contents	Basketball	Football	Volleyball	Roller-skating	Badminton	Aerobics	Sports dance	Tennis	Martial arts	Swimming	Others
Teachers' teaching	11.8	13.1	14.6	8.8	12.7	10.2	10.4	7.4	5.2	4.1	1.7
Learning efficiency	16	14	16	15	15	14	13	12	13	11	13
Interpersonal relationships	1.5	1.6	1.5	1.5	1.5	2	2	1.5	1.5	2	1.5
Satisfaction index%	11.7	12.5	13.4	10.2	11.7	11.3	11.2	5.2	2.8	3.0	7.0

Different physical education course contents are affected teachers' teaching, interpersonal relationships, learning efficiency and other factors, and then students' satisfaction index on different physical education course contents. In TABLE 4, teachers' teaching such column data represents proportion of students' evaluation on each discipline physical education teachers' teaching level in overall teachers' teaching level, such as basketball teachers' teaching level occupy 11.8% of total teachers' teaching level. Data of learning efficiency such column represents students' physical education performance comprehensive scores after each kind of physical education events exercising. Data of interpersonal relations such column represents students' interpersonal relations promotion comprehensive scores after each kind of physical education event exercising.

Factor analysis

Teachers' teaching

Teachers' teaching comprehensive levels directly affect students' satisfaction index on learning. Teachers' teaching mainly includes whether teachers' arrangement on curriculum contents and schedule is proper or not, whether curriculum textbook difficulty is proper or not, whether teachers teaching is professional , whether physical education performance test method is proper or not, whether requirements on students' learning requirement is proper or not, whether classroom atmosphere is pleasant or not , whether students have pressures, whether teachers have professional ethics, whether teachers' communication ability is good or not , whether teachers have good technological levels and so on.

Interpersonal relations

Every student will hope to have a good interpersonal relation in learning, of course, in physical education optional courses, students satisfaction index on courses is closely linked to interpersonal

relationships. Interpersonal relations mainly contain interactive relations in learning, learning status among classmates, joint exercising after class, teamwork spirits and so on.

Learning efficiency

One of students learning purposes is to get a good learning effect. Therefore, good learning effect plays crucial roles in students' satisfaction index on course. It mainly contains advancement of physical education events techniques, meeting desire to learn, acquiring basic principles and knowledge, whether is more interested in each physical education events and so on.

Establish model

(1)Record Chinese university students physical education optional course contents influence factors feature behaviors sequence as following:

$x_i^{'} = \left(x_i^{'}(1), x_i^{'}(2), x_i^{'}(3)\right)^T, i = 1,2,3$, from which correlation factor line sequence is:

$$x_1^{'} = (11.8,13.1,14.6,8.8,12.7,10.2,10.4,7.4,5.2,4.1,1.7);$$

$$x_2^{'} = (16,14,16,15,15,14,13,12,13,11,13);$$

$$x_3^{'} = (1.5,1.6,1.5,1.5,1.5,2,2,1.5,1.5,2,1.5)$$

Thereupon, it can get:

$$x_i^{'} = \begin{pmatrix} 11.8 & 13.1 & 14.6 & 8.8 & 12.7 & 10.2 & 10.4 & 7.4 & 5.2 & 4.1 & 1.7 \\ 16 & 14 & 16 & 15 & 15 & 14 & 13 & 12 & 13 & 11 & 13 \\ 1.5 & 1.6 & 1.5 & 1.5 & 1.5 & 2 & 2 & 1.5 & 1.5 & 2 & 1.5 \end{pmatrix}$$

Define reference sequence

Take Chinese university students to physical education optional course contents satisfaction index sequence $x_0^{'}$ as reference sequence,that:

$$x_0^{'} = (11.7,12.5,13.4,10.2,11.7,11.3,11.2,5.2,2.8,3.0,7.0)$$

Initialization method data processing

Utilize formula $x_i(k) = \dfrac{x_i^{'}(k)}{x_i^{'}(1)}$,to handle with relative factors line sequence, result is as following :

$$x_1(k) = \frac{x_1^{'}(k)}{x_1^{'}(1)} = (1,1.11,1.24,0.75,1.08,0.86,0.88,0.63,0.44,0.35,0.14);$$

$$x_2(k) = \frac{x_2^{'}(k)}{x_2^{'}(1)} = (1,0.88,1,0.94,0.94,0.88,0.81,0.75,0.81,0.69,0.81);$$

$$x_3(k)=\frac{x_3^{'}(k)}{x_3^{'}(1)}=(1,1.07,1,1,1,1.33,1.33,1,1,1.33,1)$$

Calculate $\min\limits_{1\le i\le 3}\min\limits_{1\le k\le 3}\left|x_0^{'}-x_i(k)\right|,\max\limits_{1\le i\le 3}\max\limits_{1\le k\le 3}\left|x_0^{'}-x_i(k)\right|$

Input $x_1(k)=(1,1.11,1.24,0.75,1.08,0.86,0.88,0.63,0.44,0.35,0.14)$;

$x_2(k)=(1,0.88,1,0.94,0.94,0.88,0.81,0.75,0.81,0.69,0.81)$;

$x_3(k)=(1,1.07,1,1,1,1.33,1.33,1,1,1.33,1)$;

$x_0^{'}=(11.7,12.5,13.4,10.2,11.7,11.3,11.2,5.2,2.8,3.0,7.0)$

into above formula and get:

$\min\limits_{1\le i\le 3}\min\limits_{1\le k\le 3}\left|x_0^{'}-x_i(k)\right|=26.34$,

$\max\limits_{1\le i\le 3}\max\limits_{1\le k\le 3}\left|x_0^{'}-x_i(k)\right|=27.89$

Calculate correlation coefficient

And correlation coefficient computational formula:

$$\zeta_i(k)=\frac{\min\limits_{1\le i\le n}\min\limits_{1\le k\le m}\left|x_0^{'}(k)-x_i(k)\right|+\rho\times\max\limits_{1\le i\le n}\max\limits_{1\le k\le m}\left|x_0^{'}(k)-x_i(k)\right|}{\left|x_0^{'}(k)-x_i(k)\right|+\rho\times\max\limits_{1\le i\le n}\max\limits_{1\le k\le m}\left|x_0^{'}(k)-x_i(k)\right|}$$

Among them, ρ is resolution ratio,and $\rho\in(0,1)$, $\rho=0.5$, ρ gets bigger and then relation is bigger.

Input $\left|x_0^{'}(k)-x_i(k)\right|$ each value , and can solve:

$\zeta_1=(1.14,1.00,0.975,0.998,0.899,0.981,1.02,0.989,0.896,0.888,0.974)$;

$\zeta_2=(1.14,1.11,0.996,0.987,0.893,0.975,1.201,1.012,1.114,0.989,0.976)$;

$\zeta_3=(1.14,1.01,1.05,0.977,0.983,0.988,0.996,0.962,1.01,0.874,0.981)$

$\zeta_4=(1.14,1.01,1.03,0.997,0.994,0.989,0.976,0.962,1.01,0.864,0.979)$

$\zeta_5=(1.14,1.01,1.04,0.997,0.983,0.987,0.978,0.962,1.21,0.884,0.979)$

$\zeta_6=(1.12,1.21,1.11,0.987,0.993,0.989,0.986,0.962,1.01,0.854,0.899)$

$\zeta_7 = (1.14,1.01,1.04,0.985,0.973,0.985,0.978,0.932,1.31,0.984,0.978)$

$\zeta_8 = (1.09,1.21,1.04,0.997,0.995,0.989,0.996,0.962,1.21,0.896,0.989)$

$\zeta_9 = (1.14,1.01,1.03,0.987,0.993,0.989,0.976,0.962,1.01,0.884,0.989)$

$\zeta_{10} = (1.14,1.11,1.04,0.978,0.993,0.989,0.976,0.875,1.01,0.894,0.981)$
$\zeta_{11} = (1.14,1.01,1.04,0.979,0.993,0.979,0.976,0.875,1.01,0.874,0.976)$

(6)Calculate correlation degree

Use correlation degree computational formula $r_i = \frac{1}{m}\sum_{k=1}^{m}\zeta_i(k)$,input

$\zeta_1 = (1.14,1.00,0.975,0.998,0.899,0.981,1.02,0.989,0.896,0.888,0.974)$;

$\zeta_2 = (1.14,1.11,0.996,0.987,0.893,0.975,1.201,1.012,1.114,0.989,0.976)$;

$\zeta_3 = (1.14,1.01,1.05,0.977,0.983,0.988,0.996,0.962,1.01,0.874,0.981)$

$\zeta_4 = (1.14,1.01,1.03,0.997,0.994,0.989,0.976,0.962,1.01,0.864,0.979)$

$\zeta_5 = (1.14,1.01,1.04,0.997,0.983,0.987,0.978,0.962,1.21,0.884,0.979)$

$\zeta_6 = (1.12,1.21,1.11,0.987,0.993,0.989,0.986,0.962,1.01,0.854,0.899)$

$\zeta_7 = (1.14,1.01,1.04,0.985,0.973,0.985,0.978,0.932,1.31,0.984,0.978)$

$\zeta_8 = (1.09,1.21,1.04,0.997,0.995,0.989,0.996,0.962,1.21,0.896,0.989)$

$\zeta_9 = (1.14,1.01,1.03,0.987,0.993,0.989,0.976,0.962,1.01,0.884,0.989)$

$\zeta_{10} = (1.14,1.11,1.04,0.978,0.993,0.989,0.976,0.875,1.01,0.894,0.981)$

$\zeta_{11} = (1.14,1.01,1.04,0.979,0.993,0.979,0.976,0.875,1.01,0.874,0.976)$

And get:

$r_1 = 1.082, r_2 = 1.084, r_3 = 1.077, r_4 = 1.052, r_5 = 1.091, r_6 = 0.856, r_7 = 0.845,$

$r_8 = 0.776, r_9 = 0.645, r_{10} = 0.861, r_{11} = 0.789$

then it gets following data TABLE 5:

TABLE 5 : Correlation degree value

Curriculum contents	Basketball	Football	Volleyball	Roller skating	Badminton	Aerobics	Sports dance	Tennis	Martial arts	Swimming	Others
Correlation degree	1.082	1.084	1.077	1.052	1.091	0.856	0.845	0.776	0.645	0.861	0.789

Evaluation result

Draw above results into bar Figure 3, and analyze conclusions:

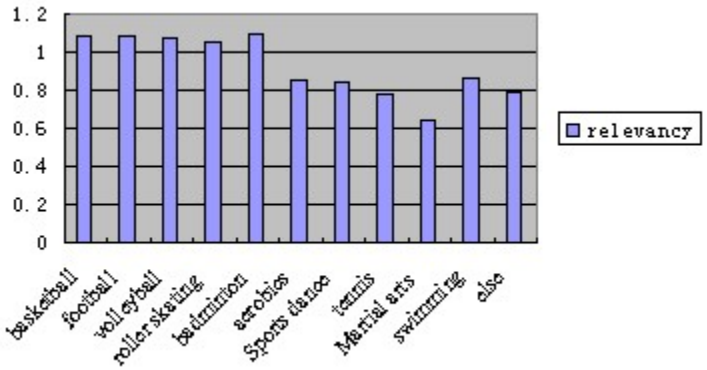

Figure 3 : Correlation value

By above bar Figure 3, it can get conclusions: badminton, volleyball, basketball, football, roller-skating correlation degree values are above 1.0, therefore, badminton, volleyball, basketball, football, roller-skating sports events are physical education curriculums are relative favored by Chinese universities students , and aerobics, sports dance, tennis, martial arts, swimming and others correlation degree values are below 1.0, it indicates university students inclination on these sports events are lower. Make comprehensive analysis and gets main cause for such phenomenon are affected by physical education teaching fields, teaching equipment, teachers comprehensive quality that can undertake each physical education teaching events and other factors, so it leads to present Chinese university students physical education mainly bases on traditional ball type education.

CONCLUSION

(1) Firstly, the paper analyzes present Chinese university students physical education status, and puts forward corresponding innovation measures on existing problems and shortcomings. By concrete analyzing Chinese vocational colleges established physical education curriculum contents setting, universities students' inclination on physical education teaching, universities students fondness degrees on physical education teaching modes, and then gets conclusions.

(2) The paper makes comprehensive analysis of Chinese university students to physical education optional courses satisfaction index influential teachers' teaching factor, interpersonal relations factors, learning effects factors. Establish regarding universities students' physical education inclination correlation degree model, by calculating university students satisfaction index on each physical education optional course contents satisfaction index and teachers' teaching, interpersonal relations, learning effects correlation degree values, and then find out relative favored events by universities students in each physical education optional courses, provide references for future university students' physical education teaching.

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